

Inverse of a Matrix

$A \in \mathbb{R}^{n \times n}$ is invertible if there is a $C \in \mathbb{R}^{n \times n}$ so that:

$$AC = CA = I_n$$

If so we write, $C = A^{-1}$

For a 2×2

Compute

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}^{-1} = \frac{1}{ad - bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

Use it to solve a Linear systems

$$A\vec{x} = b$$

$$A^{-1}A\vec{x} = A^{-1}b$$

$$I\vec{x} = A^{-1}b$$

$$\vec{x} = A^{-1}b$$